

## SHOE WITH INTERCHANGEABLE SOLE

The present invention relates to the field of footwear articles, in particular shoes for sport, and has for its  
5 object a shoe with an interchangeable sole.

The footwear articles adapted for the practice of sport are specific to each sport and, given the development in the art of materials used for their production, in particular that of their soles, there exist at present for  
10 each sport discipline several definitions of soles for an adaptation to different terrains. Thus, in particular in the field of soccer, rugby, baseball, football, Australian football, cricket or softball, it has been known for a long time to use shoes whose configuration of the sole, either  
15 as adapted to a given type of terrain, or else is such as can be modified for adaptation to different types of terrains.

By different types of terrains, practitioners identify generally dry terrain, soft terrain and heavy or wet  
20 terrain, as to the surfaces for natural play, namely grass covered, or terrains made of materials made of crushed fill (stabilized terrain), or else synthetic surfaces disposed as a covering on a subwear of concrete or the like.

The recent development of sport shoes has led  
25 manufacturers to provide shoes specific for each type or group of types of terrains and in particular shoes specific to natural terrains and to synthetic terrains of the stabilized type. Thus, the shoes suitable for stabilized or synthetic terrains can, for the practice of soccer, have  
30 a sole of synthetic material provided with blades or wedges of relatively low height and disposed very densely over all

the surface of the sole and permitting good gripping on this type of covering.

Play on natural grass terrains takes place most often with shoes of molded soles as to hard terrains and if  
5 desired soft terrains and with shoes with interchangeable cleats, in any case of heavy terrain such as, as the case may be, for soft terrains, the size of the cleats and if desired their material being adapted to the condition of the terrain.

10 The most recent developments in this field have led to the provision of shoes with molded soles for all types of terrain, the cleats being suitable, as to their size, and their number and hardness, to each particular situation. As a result, the regular practice of this sport gives rise  
15 for the practitioner of a relatively high expenditure, because he must acquire two or even three pairs of shoes.

To overcome this drawback, it has been proposed, particularly by WO 86/04489, DE 31 10 924, U.S. 3,982,336 and FR2 661 075, shoes provided with interchangeable soles  
20 that can be mounted on and dismounted from the first sole of said shoes. These documents disclose, certainly, an invisible solution to solve the problem namely, to offer the user the possibility of proceeding to an exchange of soles on a given shoe, so as to adapt said shoe to another  
25 configuration of the terrain.

However, the different devices for securement described in these documents, namely of the type with shaped coaction by snapping in (WO 86/04489, U.S. 3,982,336, FR2 661 075) or by shape coaction by slidable  
30 mounting, require supplemental means for holding permanently, for example the use of gripping elements (DE 31 10 924) or else an independent assembly element passing

through the means coacting by snapping in or by sliding insertion.

In the case in which no supplemental element of this type is provided (WO 86/04489 and U.S. 3,982,336), the holding of the interchangeable sole on the first sole of the shoe is ensured only by shape coaction of the snap-in means and the use of shoes thus provided, under severe conditions, such as those arising during sport practice subjecting the soles to strong stresses, can hardly be envisaged. This is particularly due on the one hand to the fact that the stresses, due for example to rapid modifications of pressure, are so high that there exists the risk of disassembly by tearing off of the interchangeable shoe and, on the other hand, to the fact that the different interchangeable soles that can be used can have different elasticities, such that their holding alone by snapping in can no longer be ensured.

Moreover, the soles according to the two mentioned documents do not permit ensuring peripheral sealing with the mounting and holding means, so that during practice on natural grass terrains or on terrains of the stabilized type, dirt, such as vegetable dirt, grains of sand or else tufts of grass can infiltrate between the interchangeable sole and the first shoe sole, which gives rise to trouble for the user, as well as degradation of the securement and holding of said interchangeable sole.

In the case of securement of the interchangeable sole, after its emplacement on the first sole, by means of gripping devices or the like, the problem of good holding of the sole is, to be sure, better ensured (DE 31 10 924 and FR 2 661 075), but such a securement requires the use of supplemental relatively complicated and hence costly

means whose mounting can prove to be relatively long and complicated.

However, in the practice of sport, a decision of modification of the soles of footwear articles is generally  
5 taken relatively late, namely only a short time before the beginning of a competition, and it hence necessary to be able to change shoe soles, for better adaptation of the support, in an extremely short time and by using very simple and limited tools. Moreover, it is also very  
10 important to be able to guarantee that the interface between the first sole of the shoe and the interchangeable sole remains completely clean and cannot undergo any infiltration of various dirts.

The present invention has for its object to overcome  
15 these drawbacks by proposing an interchangeable shoe sole permitting rapid mounting and unmounting and ensuring perfect grip of the sole on the shoe, even under severe conditions of the practice of sport, as well as total sealing at the interface of the first sole of the shoe and  
20 the interchangeable sole.

To this end, the interchangeable shoe sole, which is provided, below its first sole, with female or male assembly means adapted to coact with male or female assembly means of the interchangeable sole, is  
25 characterized in that it is provided on one longitudinal edge, between its front and rear ends, with a flange raised from the lower surface of the first sole and in that the interchangeable sole is also provided with a raised longitudinal flange arising from its upper surface provided  
30 with assembly means, extending between the front and rear ends of said interchangeable sole and on the side opposite, in the service position, the longitudinal flange on the

shoe, said longitudinal flanges of the shoe and interchangeable sole coacting by shape, in the service position, respectively with the corresponding edge of the interchangeable sole and of the shoe, the holding in  
5 service position of the interchangeable sole on the shoe being ensured by means of rapidly manipulable securement devices.

The invention will be better understood from the following description, which relates to a preferred  
10 embodiment, given by way of non-limiting example and explained with reference to the accompanying schematic drawings, in which: Figure 1 is a perspective view from below of a sport shoe according to the invention, the interchangeable sole being shown with its upper surface of  
15 engagement on the shoe turned upwardly, beside said shoe;

Figure 2 is a fragmentary view on a large scale and in perspective, showing a sole in the course of mounting on the lower surface of a shoe, and

Figure 3 is a perspective view representing a sport  
20 shoe in three different interchangeable soles that can outfit said shoe.

Figures 1 to 3 of the accompanying drawings show a sport shoe with an interchangeable sole, which is provided, below its first sole 1, with female assembly means 2  
25 adapted to coact with male assembly means 3 of the interchangeable sole 4.

According to the invention, the shoe is provided on one longitudinal edge, between its front and rear ends 1' and 1'', with a flange 5 that is raised from the lower  
30 surface of the first sole 1 and the interchangeable sole is also provided with one longitudinal flange 6 raised from the upper surface provided with male assembly means 3 and

extending between the front and rear ends 4' and 4'' of said interchangeable sole and on the opposite side, in the service position, to the longitudinal flange 5 on the shoe. Said longitudinal flanges 5 of the shoe and 6 of the interchangeable sole 4 coact by shape in the service position, respectively with the corresponding edges of the interchangeable sole 4 and of the shoe, the holding in service position of the interchangeable sole 4 on the shoe being ensured by means of rapidly manipulable fixing devices 7.

As shown in Figures 1 to 3 of the accompanying drawings, the female assembly means 2 provided on the first sole 1 of the shoe, are preferably constituted by transverse grooves in the form of a T shaped mortice, of dovetailed or circular or ovoidal cross-section, and the corresponding male assembly means of the interchangeable sole 4 are in the form of transverse ribs of corresponding cross-section. Thus, it is possible to ensure a good grip of the interchangeable sole 4 below the first sole 1 of the shoe against longitudinally directed stresses on this latter, as well as the holding of said sole 4 below the sole 1.

To permit obtaining, if desired, an improved flexibility for pressure at the central portion of the shoe, it is possible to provide on the upper surface of the interchangeable sole 4 male elements 3 having at least one interruption in the central region. The result is that in the region of the interruptions of the male elements 3, there exists no means for holding in the longitudinal direction, such that the interchangeable sole 4 can undergo differential deformation from that of the rest of the sole 4, which translates into less stress in the corresponding

region of the first sole and hence also in less stress on the sole of the foot and improvement in the comfort of the user.

5 The longitudinal flanges 5 and 6 of the shoe and of the interchangeable sole 4 preferably have, at their free edge, an overlapping portion with a snap-in strip 5', 6' adapted to coact with a corresponding longitudinal groove, respectively 8 of the interchangeable sole 4 (Figure 2) and 9 of the first sole 1 of the shoe (Figures 1 and 3). These  
10 longitudinal grooves 8 and 9 are adapted to ensure, on the one hand, sealing against the penetration of dirt into the interface between the first sole 1 and the interchangeable sole 4 and, on the other hand, participation in lateral holding of the interchangeable sole 4 in the service  
15 position, relative to the quick acting securement devices 7.

The front end 1' and rear end 1'' of the first sole 1, between which extends the longitudinal flange 5 of the first sole 1, each have an inclined edge delimiting a  
20 transverse groove forming simultaneously an abutment adapted to coact with the front end 4' and the rear end 4'' of the interchangeable sole 4 in the form of a wedge, of corresponding angle. Thus, during engagement by sliding of the interchangeable sole 4 on the first sole 1, the front  
25 and rear edges 1' and 1'' of said first sole 1 simultaneously form longitudinal stop abutments for said interchangeable sole 4. Moreover, because of the wedge shape of the ends 4' and 4'' of the interchangeable sole 4, a holding against separation of the ends is also ensured.

30 The rapid acting fixing devices 7 can be constituted in the form of screw heads each embedded in a hole 7' of corresponding shape provided near each end of the

interchangeable sole 4 and coacting with a tapping 7'' provided correspondingly in the first sole 1 of the shoe. These devices 7 can also be present in the form of male elements rapidly connectable and coacting with  
5 corresponding openings, such as bayonet, clip or the like assembly means.

According to one characteristic of the invention, the interchangeable sole 4 can be made of synthetic materials of different types, particularly of several materials, by  
10 molding or simultaneous injection of all the materials. In such a case, the portion adapted for mounting the sole 4 on the shoe can be made of a relatively flexible material and the portion adapted to ensure the adhesion during the practice of a sport can be made of a harder material. This  
15 is particularly the case for the production of soccer shoes of the type with cleats (Figure 2).

As shown in Figure 3 of the accompanying drawings, the interchangeable sole 4 can have a ground bearing face of different constructions, namely with long cleats for use on  
20 natural grassy terrain, with short cleats for use on natural dry terrain or else a recessed texture or with blades for connection to ground of the stabilized type or on ground of synthetic material, covered or not. The sole of the type with recessed texture is shown in the right  
25 portion of Figure 3.

It is also possible, according to another characteristic of the invention, that the interchangeable sole 4 be provided with gripping means on the terrain of the type of spikes for athletics or for playing golf or  
30 else the interchangeable sole 4 will be in the form of a traditional sole. Thus it is possible to provide a shoe which can be used for street wear as a normal shoe and



which is adapted to the practice of sport by simple and rapid changing of the sole.

Moreover, according to another characteristic of the invention, not shown in the accompanying drawings, the  
5 interchangeable sole 4 can also be provided with means for practicing sport of the ice skating type, or line skate type, or else with particular mean for blockage on the securement devices or the like. In such a case, it is possible to carry out such very specific sport practice by  
10 adaptation of the sole provided on a shoe again permitting other sports to be practiced or for an adaptation, for example, to a bicycle pedal. To this effect, a particularly interesting adaptation could exist in the field of shoes for foot races and for tennis.

15 Thanks to the invention, it is possible to provide a footwear article that can serve for different uses, in particular for sport, this by simple and rapid changing of the sole. Such an article is particularly adapted to the practice of sport on terrains that can have very variable  
20 characteristics as a function of the seasons on natural terrains or else as a function of the covering even on terrains when the latter are made of synthetic material or crushed fill material, leveled and compacted.

A particularly interesting advance of such an  
25 embodiment resides in the fact that a practitioner of sport can have more complete equipment adapted for all the situations of practicing the sport for a cost of equipment that can be substantially reduced, because it is possible to have only one pair of shoes and to buy various types of  
30 different soles, simultaneously or else as needed.

Of course, the invention is not limited to the embodiment described and shown in the accompanying

drawings. Modifications remain possible, particularly as to the construction of the various elements or by substitution of technical equivalents, without thereby departing from the scope of the protection of the  
5 invention.